

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : **SHIBAURA ENG WORKS CO LTD**

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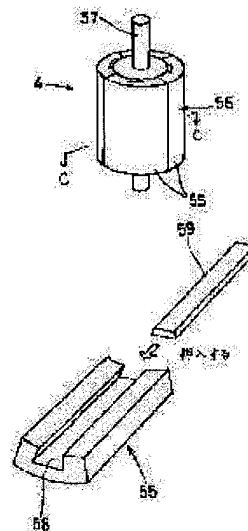
(72)Inventor : **KAWAKAMI TSUKASA**

(54) MOTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a motor which can materialize high efficiency and high output of itself and for which material relatively hard to get can be used easily.

SOLUTION: A rotor 4 comprises a tubular part 56 being a permanent magnet piece where a plurality of magnetic pieces 55 made in fan shape out of ferrite magnets are combined in tubular form, and a rotary shaft 57 being fixed at the center of the tubular part 56. At each magnetic piece 55, a groove 58 is made axially, at the center position in circumferential direction of the inside periphery, and therein a magnetic piece 59 consisting of magnetic material larger in magnetic power than the ferrite magnet, such as, for example, a rare earth magnet, etc., is mounted and fixed.



LEGAL STATUS

[Date of request for examination]

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[Date of final disposal for application]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the rotator of a motor.

[0002]

[Description of the Prior Art] Various motors, such as a motor attached in an engine and a motor to which a wiper is moved, are attached in automobiles, such as a passenger car and a truck.

[0003] Drawing 8 is a perspective diagram of the rotator 50 used for the motor of the conventional technique, and drawing 9 is a plan as which the rotator 50 was regarded [of drawing 8] from arrow mark A. Hereafter, a rotator 50 is explained with reference to the drawing 8 and the drawing 9.

[0004] A rotator 50 consists of a ferrite magnet including the tubed part 52 by which two or more pieces 51 of a magnet formed in the shape of **** were combined with tubed, and the rotation axis 53 fixed to the center of a tubed part 52. A stator (not shown) is arranged around this rotator 50, and a rotator 50 rotates by a stator producing the rotating magnetic field.

[0005]

[Problem(s) to be Solved by the Invention] About the motor using the rotator 50 of the above-mentioned conventional technique, efficient-izing and when it is going to carry out a high increase in power, by the rotator 50 using a ferrite magnet, there is a trouble where there is a limitation in respect of the magnetic intensity of a ferrite magnet. On the other hand, although it can consider using a rare earth permanent magnet as an example if it is going to improve a magnetic intensity, as compared with a ferrite magnet, the rare earth permanent magnet is expensive and cannot use a rare earth permanent magnet for the aforementioned tubed part 52 of a cheap motor.

[0006] While this invention is made that the above-mentioned trouble should be solved and the purpose attains efficient-izing of a motor, and a high increase in power, it is offering the motor which can use easily the material which is comparatively hard to come to hand.

[0007]

[Means for Solving the Problem] The motor of the claim 1 of this invention is equipped with the rotator containing the piece of a permanent magnet in which it was formed in tubed from the ferrite magnetic material, and two or more concavities which open a spacing in the inner skin at a hoop direction, and are prolonged in the orientation of an axis were formed, and the magnetic piece with which consist of a ferromagnetic magnetic material rather than a ferrite magnetic material, and each concavity of the piece of a permanent magnet is equipped, respectively.

[0008] Therefore, the flux density generated from the piece of a permanent magnet increases, and efficient-izing of a motor and a high increase in power can be attained. And the magnetic material of ferromagnetism [magnetic material / ferrite / aforementioned] can use easily the material which does not cause the cost rise with a motor steep only in a ferromagnetic material being used for a part of aforementioned piece of a permanent magnet, but comparatively seldom receives it even when it is expensive and it is hard to receive rather than a ferrite magnetic material.

[0009] Moreover, in invention of a claim 2, the aforementioned piece of a permanent magnet has two or more magnetic poles along with a hoop direction, and since the aforementioned concavity was prepared in the center position of each magnetic pole, it can increase the flux density generated from the piece of a permanent magnet to suitable timing.

[0010]

[Embodiments of the Invention] Hereafter, the motor which is one of the motors of one example of this invention is explained based on a drawing.

[0011] Drawing 1 - view 7 shows one example of this invention. drawing -- one -- this example -- a motor -- one -- front view -- it is -- drawing -- two -- a motor -- one -- drawing of longitudinal section -- it is -- drawing -- three -- a motor -- one -- using -- having -- a rotator -- four -- a perspective diagram -- it is -- drawing -- four -- drawing -- three -- an arrow -- a mark -- B -- orientation -- **** -- a rotator -- four -- having seen -- a plan -- it is -- drawing -- five -- a rotator -- four -- having --

[0012] Hereafter, the configuration of a motor 1 is explained with reference to the drawing 1 and the drawing 2. A motor 1 is a motor carried in an automobile, and is a motor of nine poles which consist of a three phase circuit of U phase, V phase, and W phase as an example. The stator 12 and the rotator 4 by which it was equipped with two or more coils 18 in the casing 2 of a motor 1 are arranged, the wiring member 20 is arranged at the lower part of a stator 12, and the wiring member 46 is arranged at the upper part of a stator 12. Casing 2 is carried out by the cover plate 5 in a lid, and the aforementioned wiring member 20 is connected to lead wire 36 so that it may mention later. The aforementioned stator 12 has the ring section 14 and nine lobes 16

which method ** of inside projected after this. The lobe 16 is making the shape of a flat surface of T characters. The upper-limit section (leader of a coil 18) of the coil 18 twisted around each lobe 16 of a stator 12 is pulled out by the upper part of a stator 12, and, as for the soffit section (leader of a coil 18) of a coil 18, the stator 12 is pulled out caudad.

[0013] Hereafter, the rotator 4 of this example is explained with reference to drawing 3 - view 5. A rotator 4 consists of a ferrite magnet including the tubed part 56 which is the piece of a permanent magnet by which two or more pieces 55 of a magnet formed in the shape of **** were combined with tubed, and the rotation axis 57 fixed to the center of a tubed part 56. In the hoop-direction mid gear of the inner skin of the, Mizobe 58 is formed in each piece 55 of a magnet along the orientation of an axis, and the magnetic piece 59 which a magnetic intensity becomes from a large magnetic material rather than ferrite magnets, such as a rare earth permanent magnet, is equipped with and fixed to it as an example in it. A stator 12 is arranged around this rotator 4, and a rotator 4 rotates by a stator 12 producing the rotating magnetic field.

[0014] Technique to assemble this motor 1 is explained in order.

[0015] ** Allot the wiring member 20 to the lower part of a stator 12, and arrange the 4th connection plate 46 on the upper part of a stator 12.

[0016] ** Weld the soffit section of the coil 18 wound around the lobe 16 of a stator 12, respectively to two or more lobes of the wiring member 20.

[0017] ** The upper-limit section of the coil 18 projected from the lower part of a lobe 16 is welded to each lobe of the 4th connection plate 46 like the above, respectively.

[0018] ** the [the stator 12 after assembling as mentioned above, the coil 18, the wiring member 20, and] -- carry out the mould of the 4 connection plate 46 to one with a mould resin The casing 2 of a motor 1 is completed by this.

[0019] ** While a rotator 4 is inserted in the cavernous section 3 of the casing 2 interior as shown in drawing 2 after completing casing 2, fix a rotator 4 to casing 2 free [rotation] by the cover plate 5. In this case, the screw setting of the cover plate 5 is carried out to casing 2.

[0020] ** Attach lead wire 36 in the piece 38 of the 1st external terminal vegetation. This means of attachment are attached by the caulking section 40 prepared in the piece 38 of the 1st external terminal vegetation. Lead wire 36 is attached also like the piece 42 of the 2nd external terminal vegetation. Lead wire 36 is attached also like the piece 44 of the 3rd external terminal vegetation.

[0021] Hereafter, the magnetic properties of a motor 1 is explained with reference to the drawing 6 and the drawing 7. In addition, the line L1 of drawing 7 (1) shows the magnetic properties of the rotator 50 of the conventional technique which used only the ferrite magnet, and the line L2 of drawing 7 (2) shows the magnetic properties of the rotator 4 of this example. The cross section of a part of motor 1 using the aforementioned rotator 4 is shown in drawing 6. As shown in drawing 6, magnetic coupling of the magnetic flux generated from a rotator 4 is carried out to each lobe 16 of a stator 12. In the rotator 4 which has the configuration mentioned above, as the flux density generated from a rotator 4 was shown in drawing 7 (2), it is the position in which the aforementioned magnetic piece 59 was formed, and it was checked that flux density is increasing rather than the line L1 which shows the conventional flux density.

[0022] Therefore, in this example, the flux density generated from a rotator 4 increases, and efficient-izing of a motor 1 and a high increase in power can be attained. Moreover, although the ferromagnetic rare earth permanent magnet is more expensive than the aforementioned ferrite magnetic material, the aforementioned magnetic piece 59 which consists of a rare earth permanent magnet cannot cause [only being used for a part of tubed part 56, and] a steep cost rise of a motor 1, but the rare earth permanent magnet which is the material which is comparatively hard to come in respect of a cost to hand can be easily used for it.

[0023]

[Effect of the Invention] When it was the motor of this invention, it was made to constitute by the above including the piece of a permanent magnet in which two or more concavities which are formed in tubed from a ferrite magnetic material in a rotator, open a spacing in the inner skin at a hoop direction, and are prolonged in the orientation of an axis were formed, and the magnetic piece with which consist of a ferromagnetic magnetic material rather than a ferrite magnetic material, and each concavity of the piece of a permanent magnet is equipped, respectively.

[0024] Therefore, the flux density generated from the piece of a permanent magnet increases, and efficient-izing of a motor and a high increase in power can be attained. And the magnetic material of ferromagnetism [magnetic material / ferrite / aforementioned] can use easily the material which does not cause the cost rise with a motor steep only in a ferromagnetic material being used for a part of aforementioned piece of a permanent magnet, but comparatively seldom receives it even when it is expensive and it is hard to receive rather than a ferrite magnetic material.

[0025] Moreover, in invention of a claim 2, the aforementioned piece of a permanent magnet has two or more magnetic poles along with a hoop direction, and since the aforementioned concavity was prepared in the center position of each magnetic pole, it can increase the flux density generated from the piece of a permanent magnet to suitable timing.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the front view of the motor in which one example of this invention is shown.

[Drawing 2] It is drawing of longitudinal section of a motor.

[Drawing 3] It is the perspective diagram of the rotator 4 used for a motor 1.

[Drawing 4] It is the C-C line cross section of drawing 3.

[Drawing 5] It is the decomposition perspective diagram of the piece of a magnet with which a rotator 4 is equipped.

[Drawing 6] It is the cross section of a part of motor 1.

[Drawing 7] It is a wave form chart explaining the magnetic properties of a motor 1.

[Drawing 8] It is the perspective diagram of the rotator 50 used for the motor of the conventional technique.

[Drawing 9] It is D-D-lines cross section of drawing 8.

[Description of Notations]

- 1 Motor
- 2 Casing
- 4 Rotator
- 12 Stator
- 14 Ring Section
- 16 Lobe
- 18 Coil
- 36 Lead Wire
- 55 Piece of Magnet
- 56 Tubed Part
- 58 Mizobe
- 59 Magnetic Piece

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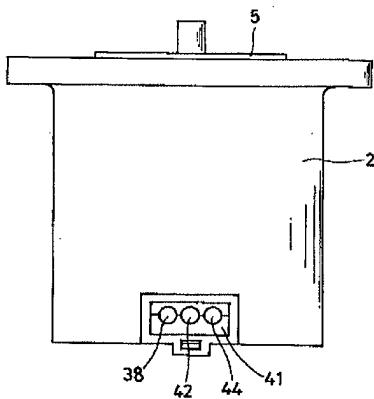
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DRAWINGS

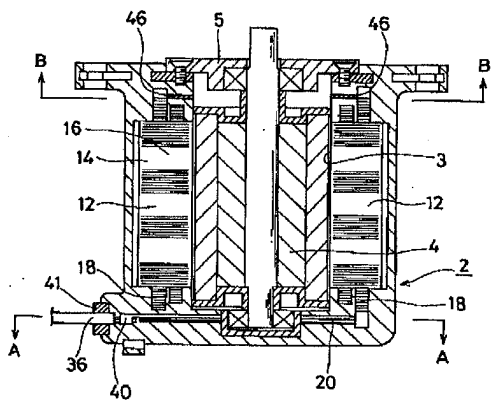
[Drawing 1]

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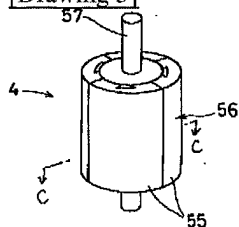


[Drawing 2]

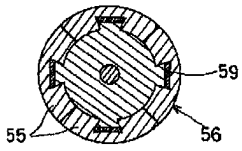
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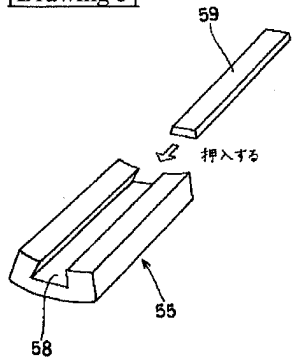
[Drawing 3]



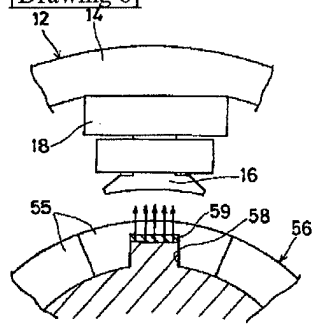
[Drawing 4]



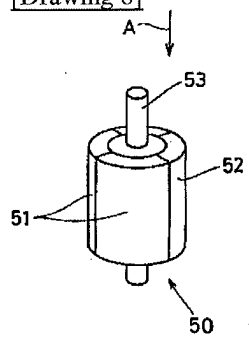
[Drawing 5]



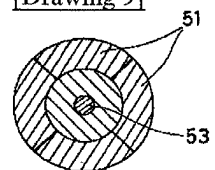
[Drawing 6]



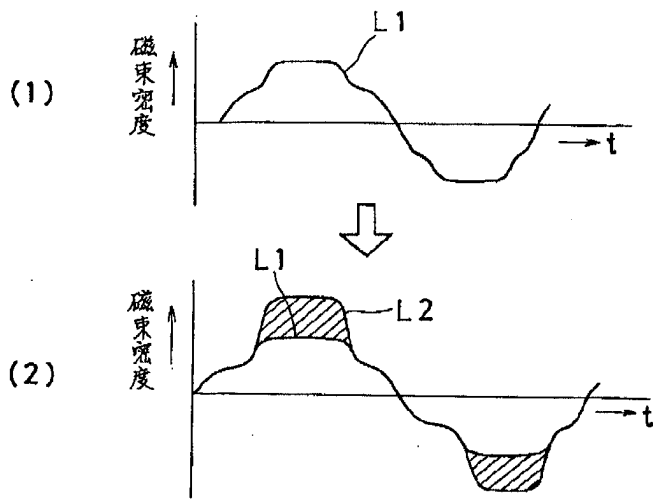
[Drawing 8]



[Drawing 9]



[Drawing 7]



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MEANS

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[0009] Moreover, in invention of a claim 2, the aforementioned piece of a permanent magnet has two or more magnetic poles along with a hoop direction, and since the aforementioned concavity was prepared in the center position of each magnetic pole, it can increase the flux density generated from the piece of a permanent magnet to suitable timing.

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CLAIMS

[Claim(s)]

[Claim 1] A motor equipped with the rotator containing the piece of a permanent magnet in which it was formed in tubed from the ferrite magnetic material, and two or more concavities which open a spacing in the inner skin at a hoop direction, and are prolonged in the orientation of an axis were formed, and the magnetic piece with which consist of a ferromagnetic magnetic material and each concavity of this piece of a permanent magnet is equipped rather than this ferrite magnetic material, respectively.

[Claim 2] It is the motor according to claim 1 with which the aforementioned piece of a permanent magnet has two or more magnetic poles along with a hoop direction, and the aforementioned concavity is prepared in the center position of each magnetic pole.

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TECHNICAL PROBLEM

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Effect

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Field

[The technical field to which invention belongs] this invention relates to the rotator of a motor.

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Technique

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[0003] Drawing 8 is a perspective diagram of the rotator 50 used for the motor of the conventional technique, and drawing 9 is a plan as which the rotator 50 was regarded [of drawing 8] from arrow mark A. Hereafter, a rotator 50 is explained with reference to the drawing 8 and the drawing 9 .

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